

SURVEILLANCE OF SCHOOL VIOLENCE, INJURY, AND DISCIPLINARY ACTIONS

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The safety of America's schools is a major issue. Yet, the magnitude of the problem cannot be accurately assessed because some of the data concerning incidents and disciplinary actions come from reporting systems that are seriously flawed. In this article we examine how data from student self-report surveys and other sources can be used to assess the weaknesses in current school incident-reporting systems and improve the validity of surveillance data on school violence. Particular attention is paid to assessing the validity of data from Gun-Free Schools Act (GFSA) reports on the number of guns in schools in light of nationally representative student survey data. We also discuss the difficulties of obtaining accurate surveillance data and suggest changes in surveillance systems that could produce more valid estimates of violence and injury in our nation's schools. © 2001 John Wiley & Sons, Inc.

The safety of children in school is of concern to the American public in general, to parents, and to the children themselves. An April 1999 Gallup poll found that 43% of parents fear for their children's safety while they are at school (The Gallup Organization, 1999). An April 1998 poll of teenagers found that they believed violence to be the single largest problem in their schools (Maguire & Pastore, 1998). School authorities take this concern seriously and have a further legal obligation to safeguard children in school. Other members of society (whether parents or not) also want to create and maintain safe environments for learning.

DISCIPLINARY SURVEILLANCE

Schools have long tracked individual student behavior, chiefly as a means of providing graduated sanctions for repeated offenses. In small schools, this began as little more than the memory of the classroom teacher or principal. As school size increased, tracking systems were developed on paper. The computer age automated the process in some schools, which began using spreadsheets and mainframe-based student information systems. These systems were developed before the recent heightened interest in school safety and remain generally unsophisticated in addressing that specific domain. Statewide reporting of suspensions and expulsions developed as part of the work of state education agencies. Until recently, however, it was uncommon for states to require all schools to report data on less-severe disciplinary actions and violence-related incidents.

In response to the increase in statewide reporting of violence and other incidents or disciplinary actions, the National Education Statistical Agenda Committee of the National Forum on Education Statistics established the Task Force on School Crime, Violence, and Discipline in spring 1995. The Task Force commissioned the first study of statewide school-based incident reporting in the fall of that year [U.S. Department of Education (ED), 1996]. That report addressed three needs: (a) to describe the state data collection systems as they managed the collection of information on school-related crime, violence, and discipline; (b) to recommend to states and to the National Center for Education Statistics a model set of definitions for the collection of such data; and (c) to describe a model data collection system that could be implemented within a state or adapted for use in a school district.

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FEDERAL SURVEILLANCE REQUIREMENTS FOR SCHOOLS

The Task Force recommendations reached schools just as three federal reporting requirements were being enacted for all states. In 1994, the federal Gun-Free Schools Act (GFSA, 1994) required the states to report annually to the U.S. Department of Education the number of students expelled (from public school districts that receive a certain type of federal funding) for carrying a firearm to school, by type of firearm, and school level (e.g., elementary, junior high, or senior high). The definition of "firearm" includes four types of arms: handguns, rifles, shotguns, and "other firearms," which includes, but is not limited to, silencers, explosive or destructive devices, and starter guns (ED, 1999a).

According to the GFSA report for the 1996–1997 academic year, 6,091 students were expelled from schools in the 50 states and the District of Columbia for possession of firearms at school (ED, 1998a). The report acknowledges that the validity of this estimate is low because many states did not understand what they were supposed to report. California and Maryland, for example, reported all school incidents involving a gun, not just those resulting in an expulsion. Colorado, Missouri, and Ohio reported expulsions for all types of weapons, not just firearms. The District of Columbia did not report any expulsions because its expulsion policy was not enforced that year. Mississippi reported only expulsions for possession of handguns, and the estimate from New York was based on reports from only 71% of its local educational agencies. In all, the report identified six states that were thought to have overestimated the number of firearm-related expulsions in their reports. Three other states reported only a fraction of the expulsions that they should have (ED, 1998a).¹

The 1997–1998 GFSA estimates were less affected by confusion about what was to be reported. Missouri, once again, reported expulsions for both firearms and other weapons. New York reported figures from only 78% of its local educational agencies. The GFSA report lists few other important caveats to the estimate that 3,927 students were expelled for firearm possession at school in the 50 states and the District of Columbia during the 1997–1998 school year (ED, 1999a).^{2,3}

Three states (Michigan, Oregon, and Tennessee) were unable to disaggregate reported expulsions by school level. Of the 3,496 expulsions that were reported by school level, 339 (9.7%) were expulsions of elementary school students, 1,162 (33.2%) were expulsions of junior high students, and 1,995 (57.1%) were expulsions of senior high students (ED, 1999). Reported expulsions from Michigan, Nebraska, North Carolina, and Tennessee were not disaggregated by type of firearm. The remaining 46 states and the District of Columbia reported 2,396 expulsions for possession of handguns, rifles, or shotguns and 1,108 expulsions for possession of "other firearms" (ED, 1999).

One means of gauging the validity of these GFSA figures is to compare them to estimates from recent surveys that have asked students in junior and senior high schools to self-report their weapon-carrying behaviors. One such survey is the Monitoring the Future (MTF) Study, a nationally representative survey of students in grades 8, 10, and 12 conducted annually by the Survey Research Center at the University of Michigan and funded by the National Institute on Drug

¹The 1997–1998 GFSA report included revised expulsion counts for 1996–1997 from North Carolina and Colorado. Using these revised estimates, there were 5,722 reported firearm-related expulsions in the 50 states and the District of Columbia for the 1996–1997 school year.

²The U.S. Department of Education has declared that expulsions for firearm possession at school decreased significantly during the 1997–1998 school year as compared to the 1996–1997 school year (ED, 1999b). The Department has also noted, with approval, the smaller decrease in reported expulsions during the 1998–1999 school year as compared 1997–1998 (ED, 2000). However, the serious and acknowledged problems with many of the estimates in the 1996–1997 and 1997–1998 GFSA reports suggest that this apparent decrease in firearm-related expulsions may be a reporting artifact rather than a real improvement.

³The estimated number of expulsions was subsequently revised downward from 3,927 to 3,655 (ED, 2000).

Abuse (Johnston, Bachman, & O'Malley, 2000; Johnston, Bachman, O'Malley, & Schulenberg, 2000). Each year since 1994, the MTF questionnaire has asked students to report how many days they carried a gun "to school" during the 4 weeks preceding the survey. Multiplying the proportion of students who reported carrying a gun 1 or more days by the number of students in the population yields an estimate of the number of students who carried a gun to school during a typical 4-week period.

The Monitoring the Future Study has several noteworthy shortcomings for this type of extrapolation. First, although the MTF uses a stratified, multistage, cluster sample, the public-use data files do not include the sampling unit and stratification variables required to produce variance estimates that account for the sampling design. The data file does include a probability weight, however, so that unbiased point estimates can be generated. Second, the MTF question asks about carrying a gun "to school" but leaves the precise meaning of that phrase undefined. Consequently, some proportion of the students who report carrying a gun may not have carried the weapon inside a school building or even onto school property. The gun could have been hidden or handed off to someone else before the student arrived at school. Such gun carrying that takes place on the way "to school" but stops short of being gun carrying "at school" would not be reflected in the GFSA estimates because school officials are not expected to discipline students for infractions that take place off school property. Finally, the MTF sampling frame includes public and private schools only in the 48 contiguous states; schools in Alaska, Hawaii, and the District of Columbia are excluded.

With these caveats in mind, Table 1 displays the percentages of students in each of the three grade levels who report carrying a gun to school for the 1997 and 1998 administrations of the MTF questionnaire. Because MTF is administered during the spring semester of each academic year, the school enrollment estimates prepared by the Census Bureau for the month of October preceding the MTF administration are used to perform the extrapolation (U.S. Bureau of the Census, 1997, 1998). The extrapolated MTF estimate that 350,000 students in only three grades carried a gun to school (see Table 1) is substantially larger than the GFSA estimate of about 4,000 expulsions for gun carrying in grades K–12.

Table 1
*Estimated Number of Students Who Carried a Gun to School
During the Four Weeks Preceding the Survey*

	% Reporting gun carrying	Enrolled student population	Total estimated gun carriers
1997			
Grade 8	3.2	3,774,000	120,000
Grade 10	3.5	3,934,000	140,000
Grade 12	2.9	3,662,000	110,000
Total 1997			370,000
1998			
Grade 8	3.1	3,775,000	120,000
Grade 10	3.6	4,068,000	150,000
Grade 12	2.1	3,935,000	83,000
Total 1998			350,000

Source: Authors' analysis of Monitoring the Future Study [computer data file].
Estimates of enrolled student population from U.S. Bureau of the Census (1997, 1998).

A second nationally representative survey, the National Longitudinal Study of Adolescent Health (Add Health),⁴ provides a second set of student self-report estimates to which the GFSA estimates may be compared. The National Longitudinal Study of Adolescent Health is a longitudinal study of a nationally representative sample of adolescents who were in grades 7 through 12 in 1995. Although Add Health used a stratified, multistage, cluster sample similar to that used by MTF, the Add Health data files include the design variables required to compute adjusted variance estimates (Chantala & Tabor, 1999).

While MTF asks a single question to measure the prevalence of carrying a gun to school, the Add Health study asked two questions to produce a conservative estimate of gun carrying. The first question, which was asked of all students, inquired how often they had carried a weapon "to school" during the 30 days preceding the interview. Respondents who answered that they had carried a weapon to school on one or more of the preceding 30 days were asked to indicate what type of weapon they had carried to school most often during that time period (Carolina Population Center, 1997). Only those students who reported carrying handguns, rifles, or shotguns most often at school were counted as gun carriers. Consequently, the Add Health estimates are probably a somewhat conservative estimate of the prevalence of carrying a gun to school.

The Add Health estimates for grades 7 through 12 can be extrapolated to the population using Census estimates of school enrollment from October 1995 (U.S. Bureau of the Census, 1996; see Table 2). Based on the Add Health data, between 200,000 and 310,000 students in grades 7–12 carried a gun to school more often than any other type of weapon in 1995. While this lower estimate is approximately 50 times greater than the number of expulsions for gun carrying in the 1997–1998 GFSA report, the upper estimate from the Add Health data is somewhat lower than estimates extrapolated from the 1997 and 1998 MTF data. We estimate that when all factors are considered and student reports are extended to cover a full year and multiple episodes of gun carrying, the true number of student gun-carrying incidents may be well over 100 times higher than GFSA data suggest and invite closer analysis of this problem.

Respondents to the Add Health Study were interviewed in their homes and entered responses to the most sensitive questions directly into a laptop computer. The MTF study, by contrast, is a classroom survey using a paper-and-pencil questionnaire. Although the two surveys used substantially different methodologies, their respective estimates are similar, and the Add Health estimate is smaller, as expected. It is noteworthy that the estimates of gun carrying to school from the MTF study have been highly stable in each of the 5 consecutive years that the question has been asked (see Table 3). Together, these facts suggest that the surveys offer reasonably valid and reliable measures of the prevalence of carrying a gun to school.

Although the validity of these survey estimates is probably quite high, like all survey estimates, they include some amount of error. One source of error is sampling error. The likely bounds

⁴This research is based on data from the Add Health project, a program project designed by J. Richard Udry (PI) and Peter Bearman and funded by grant P01-HD31921 from the National Institute of Child Health and Human Development to the Carolina Population Center, University of North Carolina at Chapel Hill, with cooperative funding participation by the National Cancer Institute; the National Institute of Alcohol Abuse and Alcoholism; the National Institute on Deafness and Other Communication Disorders; the National Institute of Drug Abuse; the National Institute of General Medical Sciences; the National Institute of Mental Health; the National Institute of Nursing Research; the Office of AIDS Research, NIH; the Office of Behavior and Social Science Research, NIH; the Office of the Director, NIH; the Office of Research on Women's Health, NIH; the Office of Population Affairs, DHHS; the National Center for Health Statistics, Centers for Disease Control and Prevention, DHHS; the Office of Minority Health, Centers for Disease Control and Prevention, DHHS; the Office of Minority Health, Office of Public Health and Science, DHHS; the Office of the Assistant Secretary for Planning and Evaluation, DHHS; and the National Science Foundation. Persons interested in obtaining data files from The National Longitudinal Study of Adolescent Health should contact Jo Jones, Carolina Population Center, 123 West Franklin Street, Chapel Hill, NC 27516–3997. E-mail: jo_jones@unc.edu

Table 2

Estimated Number of Students Who Carried a Gun to School More Often Than Any Other Type of Weapon in the 30 Days Preceding the Interview, 1995

	95% Confidence interval			Total estimated gun carriers		
	% Reporting gun carrying	Lower bound	Upper bound	# Enrolled students	Lower estimate	Upper estimate
Grade 7	0.9	0.5	1.6	3,920,000	20,000	63,000
Grade 8	1.4	1.0	2.1	3,724,000	37,000	78,000
Grade 9	1.5	1.0	2.3	3,830,000	38,000	88,000
Grade 10	1.2	0.8	1.8	3,742,000	30,000	67,000
Grade 11	0.7	0.4	1.2	3,450,000	14,000	41,000
Grade 12	1.1	0.7	1.7	3,594,000	25,000	61,000
Grades 9–12	1.1	0.9	1.4	14,616,000	130,000	200,000
Grades 7–12	1.1	0.9	1.4	22,260,000	200,000	310,000

Source: Authors' analysis of National Longitudinal Study of Adolescent Health, Wave I, In-Home Student Interview, 1995 [Electronic data set]. Estimates of enrolled student population from U.S. Bureau of the Census (1996). All survey estimates adjusted for design effects using Intercooled Stata 6.0 in accordance with recommendations in Chantala and Tabor (1999).

of sampling error can be determined by calculating the standard error of a survey estimate, as was done with the Add Health estimates (see Table 2). Unfortunately, as noted before, the standard errors of the MTF estimates cannot be computed.

Other sources of measurement error are impossible to quantify based on the information available. It is possible to describe the nature of the most likely sources of error, however, and, to a lesser extent, to speculate about whether the survey estimates are more likely to be inflated or attenuated as a result. For example, some students who have actually carried a gun to school during the time period specified by the question perhaps refrain from reporting the behavior because it is widely regarded as a serious infraction. Students who carried a gun and who believe that there is some chance, however small, that they may be associated with their responses may elect to leave the question blank or to report falsely that they have not carried. In either event, this type of bias would attenuate the survey estimate.

Other students are probably inclined to report gun carrying even if they have not actually done so or if they last carried a gun to school sometime before the reference period of the survey question. This type of false reporting might serve to harmonize the student's responses with a deviant self-image or with the norms of a deviant peer group. This second type of false reporting would inflate the survey estimates. Based on the information available, it is not possible to determine which type of false reporting is more common.

A third possible type of error involves no deliberate misreporting, just simple forgetting (or "misremembering") in good faith. In general, self-report surveys of this type offer no greater an incentive for answering the questions honestly and completely than for answering dishonestly and incompletely. As a consequence, the predilections of individual students to report carefully and truthfully or otherwise can have an important influence on the survey estimates. Further research is required to permit estimates of the magnitude of these several sources of error and their direction.

Despite the acknowledged error in the reviewed estimates of gun carrying in schools, these comparisons between the two student surveys and the GFSA reports suggest that the GFSA reports reflect only a fraction of the students who carry guns to school. The implications of this observation are tempered by recognition of several reasons why it would be unreasonable to expect the

Table 3
*Frequency of School-Related Gun Carrying During the Four Weeks
 Preceding the Survey*

Year	Number of days carrying	Grade 8 %	Grade 10 %	Grade 12 %
1994	None	95.3	96.1	97.3
	1 day	1.2	0.8	0.4
	2 days	0.8	0.5	0.1
	3–5 days	0.6	0.5	0.3
	6–9 days	0.3	0.4	0.4
	10+ days	1.8	1.7	1.5
1995	None	96.3	96.4	96.9
	1 day	1.2	0.7	0.8
	2 days	0.5	0.5	0.6
	3–5 days	0.4	0.3	0.1
	6–9	0.3	0.3	0.4
	10+ days	1.2	1.7	1.2
1996	None	96.1	97.0	96.8
	1 day	0.9	0.6	0.7
	2 days	0.4	0.4	0.4
	3–5 days	0.5	0.3	0.2
	6–9 days	0.4	0.3	0.2
	10+ days	1.7	1.4	1.7
1997	None	96.8	96.5	97.1
	1 day	0.9	0.5	0.6
	2 days	0.3	0.5	0.4
	3–5 days	0.4	0.3	0.3
	6–9 days	0.2	0.4	0.1
	10+ days	1.4	1.7	1.6
1998	None	96.9	96.4	97.9
	1 day	1.0	0.7	0.6
	2 days	0.4	0.4	0.2
	3–5 days	0.2	0.3	0.1
	6–9 days	0.3	0.3	0.4
	10+ days	1.2	1.9	1.0

Source: Authors' analysis of Monitoring the Future Study [Electronic data set].

GFSA estimates to be similar to those from the student surveys. First, although the GFSA estimates should reflect the number of expulsions and modified expulsions, it is not clear that schools are reporting all the students who have been “caught” with guns at school. Those students who have guns and are suspended or referred to an alternative school may not be consistently reported in GFSA counts, for example. A survey of principals and school disciplinarians conducted by the National Center for Education Statistics found that during the 1996–1997 academic year, only between 20% and 42% of students caught with guns at school were expelled for the offense (ED, 1998b). Consequently, the number of students known (by school officials) to have carried a gun to school could be as much as five times larger than the count of expulsions in the GFSA reports. Nor will school administrators catch every student who carries a gun to school. The best that can be expected is that they will catch most of them and respond judiciously.

We have been unable to get to a clear agreement on the laws regarding incident reporting, despite extensive efforts. The GFSA estimates represent a smaller population of students than the survey estimates. The GFSA apparently only requires reports from public school districts that receive SDFSCA funding. Private schools are not required to report (ED, 1995b). While the text of the GFSA indicates that public school districts that do not receive SDFSCA funds are exempt from the reporting requirement, the document prepared by the U.S. Department of Education to guide SEAs into compliance with GFSA states that, "Each State must report annually on . . . the number of students expelled in each LEA [local educational agency]" (ED, 1995b). That is, the U.S. Department of Education seems to have construed the GFSA as imposing a reporting requirement on all public (but not private) schools. In either case, the MTF and Add Health survey estimates are representative of the responses of students in both public and private schools nationwide.

Finally, as noted above, some proportion of the students who reported gun carrying on the student surveys probably did not carry the gun on school property or inside a school building. The GFSA reports reflect only gun-related violations that occur where school officials have the authority to punish the offending student.

While the preceding factors suggest that the gap between the GFSA estimates and the survey estimates is narrower than it appears, other factors suggest that the gap could be larger. For example, the GFSA estimates reflect gun carrying for grades K–12 for an entire academic year, while the student surveys reflect gun carrying only among older students (i.e., grades 7–12) during a fraction of a school year (i.e., roughly one month). In addition, most respondents to the student surveys probably do not consider silencers, bombs, and poison gas to be "guns," but the GFSA definition of a "firearm" includes these items. On the other hand, students perhaps regard air guns as "guns" when responding to the surveys although the GFSA definition of a "firearm" excludes them.

A final reason for the gap between the GFSA estimates and those from the student surveys is the one that is most in need of a remedy: The procedures most schools use to track disciplinary infractions and punishments are incomplete and unsophisticated. Many existing school safety surveillance systems monitor only a few narrow categories of violent behavior, fail to detect a substantial proportion of incidents, and do not record many of the incidents that are detected.

If these data collection procedures could be improved, school administrators would have more accurate measures of the nature and scope of the disciplinary problems they face. The remainder of this report summarizes what is known about the current state of these data collection procedures, the obstacles to reforming them, and offers some recommendations that could yield more valid estimates of the prevalence and incidence of school violence, injury, and disciplinary action.

REPORTING PROBLEMS WITHIN SCHOOL DISTRICTS

Our experience with State Education Agency staff, schools, school staff, and students suggests that a variety of additional obstacles to valid surveillance are operative at the school level:

- Some students operate under a "code of silence"—they refuse to report infractions that escape the notice of school staff. In some cases, this code of silence extends to the reporting of even serious infractions that endanger the safety of students and staff.
- School personnel do not always provide the close supervision necessary to detect the majority of events, and monitoring systems (e.g., security cameras) are often difficult to use or expensive to install and/or operate.

- Observed infractions may not be routinely transferred to written reports, allowing many known infractions to go unrecorded.
- Training for the school staff members who are responsible for logging reported infractions is often comprised entirely of printed manuals rather than skills training with behavioral rehearsal and individualized feedback.
- School-level surveillance systems are rarely subjected to external audits.
- School officials may face political pressure from their superiors, parents, elected officials, and community members to keep their incident-reporting levels low.

The political pressures against reforms may be most powerful in school districts most in need of improved surveillance systems: Those that currently detect and report only a fraction of all incidents. An administrator in such a district, who streamlined record-keeping and encouraged reporting by students and staff would soon face politically charged questions about the sharp rise in incidents. Explaining that the data produced under the new reporting procedures are not comparable with data from previous reporting periods would not necessarily quell the questions. The optimal outcome would be for all schools to enhance their reporting systems simultaneously, but the second-best, and more likely, outcome is that few of them will change their systems and risk the confidence of the communities they serve.

Currently, no guarantees of anonymity or privacy accompany federal reporting requirements for school violence. Furthermore, many states post school violence data on the Internet with the name of the school attached. In this environment, any improvements in the validity of incident data initiated by individual schools or school districts are likely to carry a negative public impact for the intrepid administrators. Allowing schools to submit incident reports stripped of school identifiers might be one means of allaying this concern. Another would be to establish and enforce mandates for improving reporting systems at the state or school district level. The purpose of this approach would be to ensure that the reporting statistics from a group of schools moved in the same direction at approximately the same pace, thereby reducing the likelihood that any one school would become a focus of unwarranted criticism.

An understanding of the shortcomings of many existing school surveillance systems may lead to reforms to improve the validity of these data. Without agreement on the nature of the problem, however, resources and attention will not be focused as fully on the issue. In addition to data validity, other aspects of school surveillance systems are also in need of reform. For example, most schools collect data on only a few different types of incidents, and the definitions of incidents vary across school districts and states. Consequently, the scope of information offered by school surveillance data is low, and incident rates cannot be meaningfully compared across schools, school districts, or states.

A National Surveillance System

Efforts to improve the surveillance systems of school districts nationwide are likely to proceed at a glacial pace. There are simply too many school districts, each facing unique obstacles to reform, to expect rapid progress. In the interim, sampling techniques could be used to produce more valid, nationally representative, surveillance data by developing a national surveillance system. A random sample of a few hundred schools (or school districts) throughout the U.S. could be selected to participate in the system. Each selected school or district would receive a half-time external evaluator, a microcomputer, incident surveillance software, and training. Each selected school would be linked to a central computer network that would collect incident reports in real-time, with student identifiers removed. Aggregated data for the nation might be made available

on-line through secure servers accessible only to researchers who had applied for access. Reports, aggregated to both the state and national levels, would be available on-line to the public. The goals of such a system would be to increase the accuracy, timeliness, and comparability of incident reports, while providing information on perpetration, victimization, injury, and discipline.

CONCLUSIONS

Even if a national surveillance system is developed, efforts to improve incident reporting in all schools must continue. Incident reporting systems should be reformed to meet the recommendations of the Task Force on School Crime, Violence, and Discipline. The recommendations of the Task Force should be expanded to include: (a) models for within-perpetrator aggregation of data to study students who are “repeat offenders,” (b) models for victimization data, (c) models for injury surveillance data, and (d) training guidelines for school-level staff charged with the task of recording surveillance data. Additional initiatives that should be considered include the following:

- Researchers should explore the obstacles to more accurate reporting in focus groups and interviews with school personnel and students to develop remedies.
- Government and private industry should fund demonstrations of school-based monitoring systems for school violence and weapon-carrying using the incident surveillance software (e.g., GBA Systems Product SSP) and Web-based reporting utilities (e.g., Report-It.com) that have recently become available.
- SEAs or their vendors should audit school incident reporting records. These audits should include the administration of anonymous student self-report surveys as well as assessments of processes used to report and record incident data.

Many school officials genuinely want to know what is going on in their schools and are courageous enough to deliver accurate reports. Some already have well-developed surveillance systems in place that can be expected to yield reasonably accurate data on school incidents. Their success should be applauded and studied. One of the first research steps should be to find out what is working, and why, so that the success of these innovative administrators might inform the efforts of those whose systems are still improving.

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